

Multi-Modal Modelling: BIM Templates for Hub Design and Networks



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Cooperative Mobility for
Competitive Megaregions



CM²

Cooperative Mobility for
Competitive Megaregions



CM2 Mission

- to become a leading Tier 1 center specialized in megaregion mobility research, offering advice on strategic transportation planning, smart infrastructure investments, and informed policy-making.
- to promote multimodality for diverse populations and communities, ranging from high-speed rail to slow-moving transportation, such as walking and bicycling. We also promote and facilitate public-private partnerships for freight mobility planning and operation efficiency.
- to provide high-quality transportation education and workforce development and to connecting research with practical actions.

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Year 1: Passenger Transportation

“Infrastructure investments are prescribed to stimulate the economy in the short term by creating **construction** employment, and to foster longer-term economic growth by making the **transportation system** more efficient and reliable.”

-Professor Martin Wachs

B I M

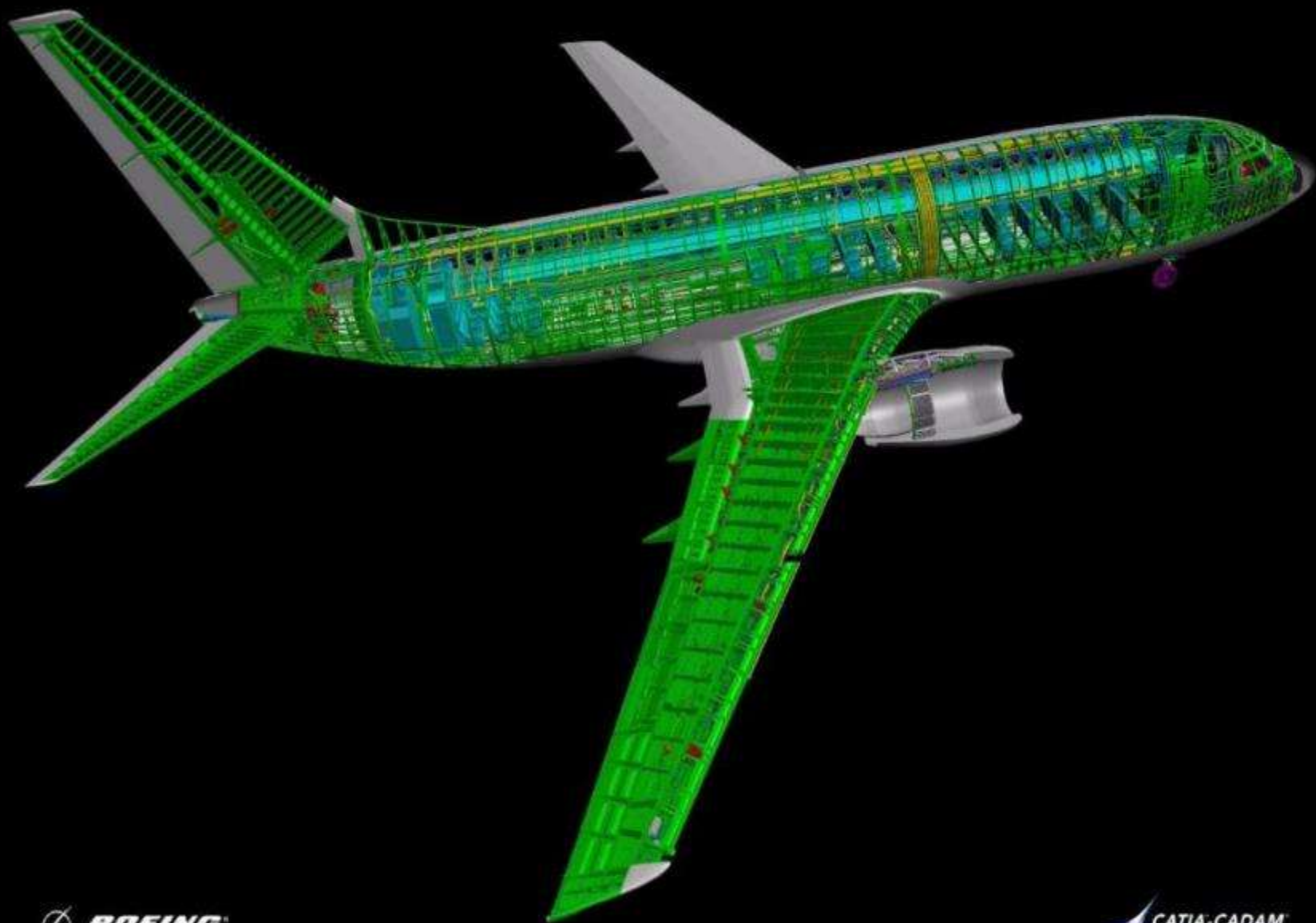
A data rich digital representation of physical and functional characteristics of a facility. Typically, it is a shared knowledge resource for information.

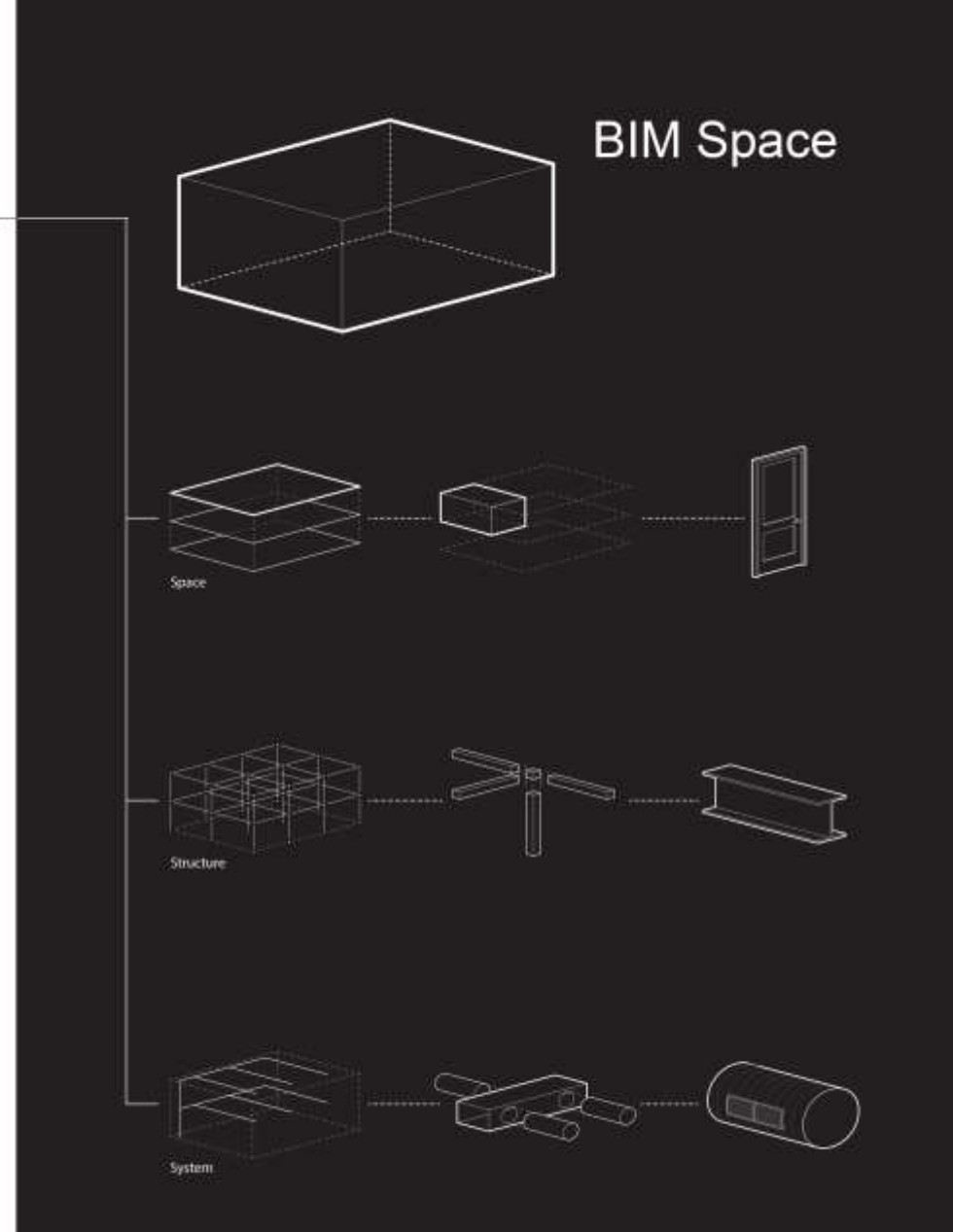
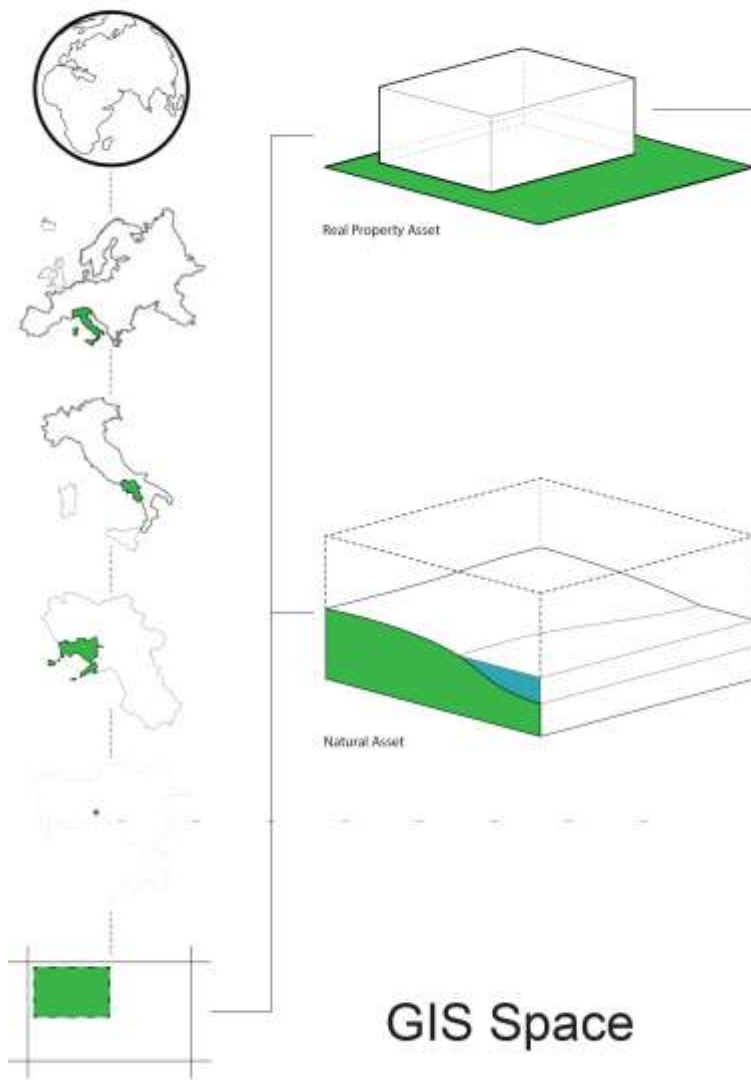
Building Information Modelling (BIM)

CM2 Research Topic Areas

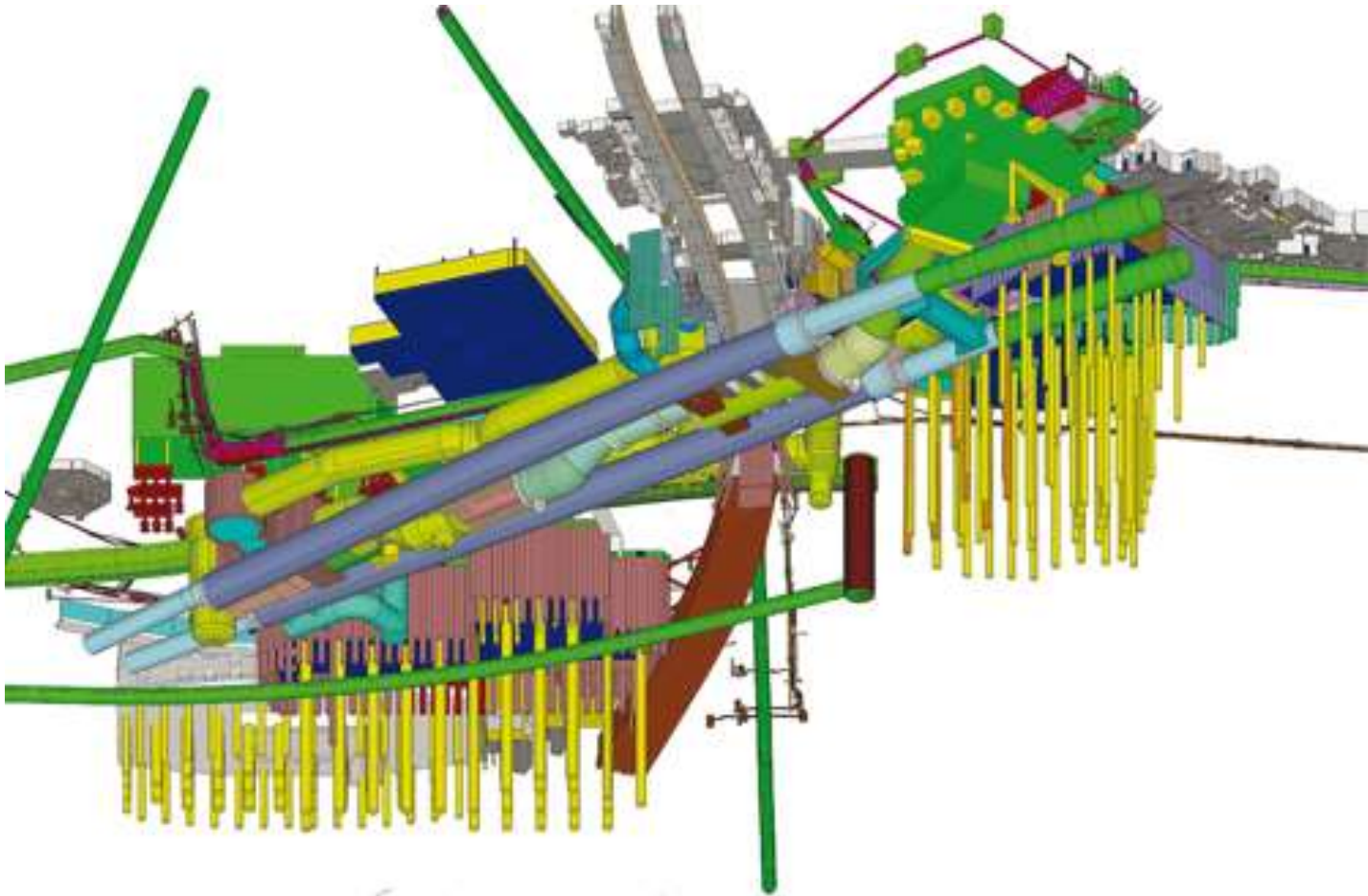
3 Innovations in multi-modal planning and modeling for high-growth regions

- 3.1 Optimizing multi-modality through the optimal combination and utilization of different modes for intra-megaregion travel
- 3.2 Optimizing inter-modality through research on the applications of technologies such as GeoDesign and **Building Information Modeling (BIM)** to improve multi-modal integration in transit hubs





Beyond BIM (Danelle Briscoe)



Section of Victoria Line
Closed Due to Concrete Ingress

[illegible]

3D → 4D → 5D → 6D → 7D



Qualitative Studies



Rotterdam overpass



Barcelona Train station



Madrid Barajas Airport

LA Union Station Bike Hub
Los Angeles, CA





Metro Rail		
RED W	10:00 AM	10:00 AM
RED W	10:15 AM	10:15 AM
RED W	10:30 AM	10:30 AM
RED W	10:45 AM	10:45 AM
RED W	11:00 AM	11:00 AM
Regional Buses		
LAS H	10:00 AM	10:00 AM
LAS H	10:15 AM	10:15 AM
LAS H	10:30 AM	10:30 AM
LAS H	10:45 AM	10:45 AM
LAS H	11:00 AM	11:00 AM





Projects

- Open...
- New...
- Construction Template
- Architectural Template
- Structural Template
- Mechanical Template



2_3d design viz_
dataset_dpj



using the pen tool to
control line work



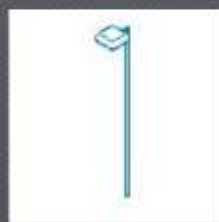
sustainability dataset_
model



sustainability dataset_
model_A BIM_
concept

Families

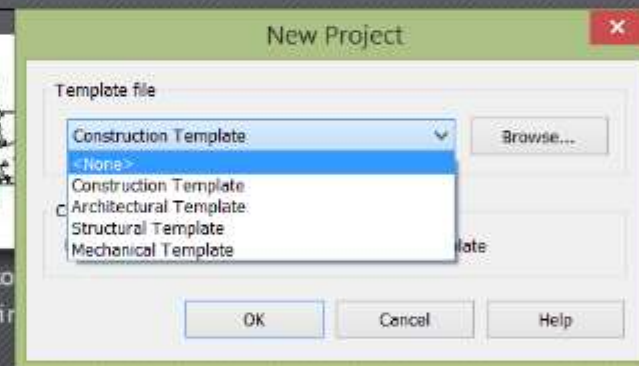
- Open...
- New...
- New Conceptual Mass...



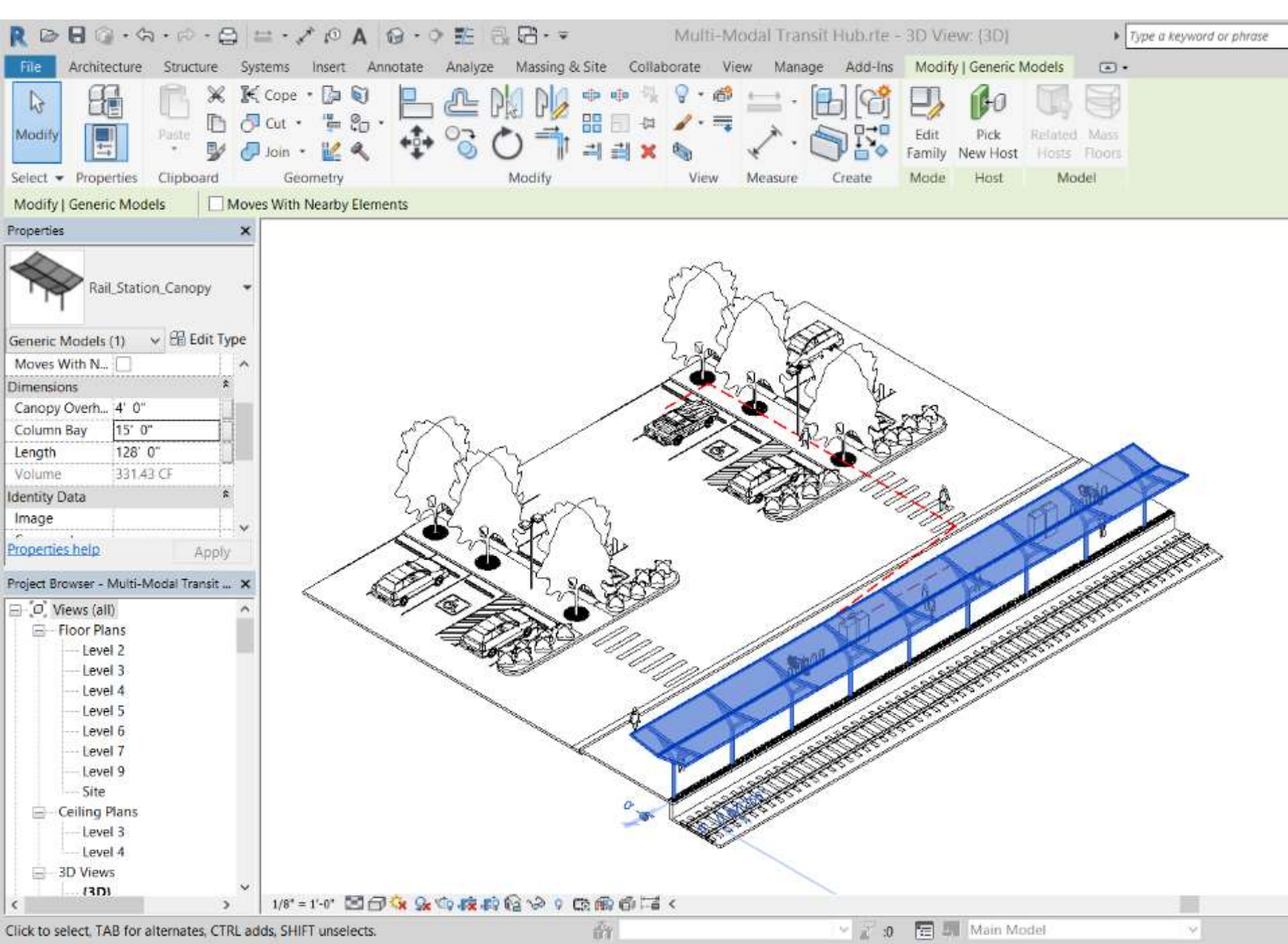
121-Lighting_
Landscape_Street_
Light

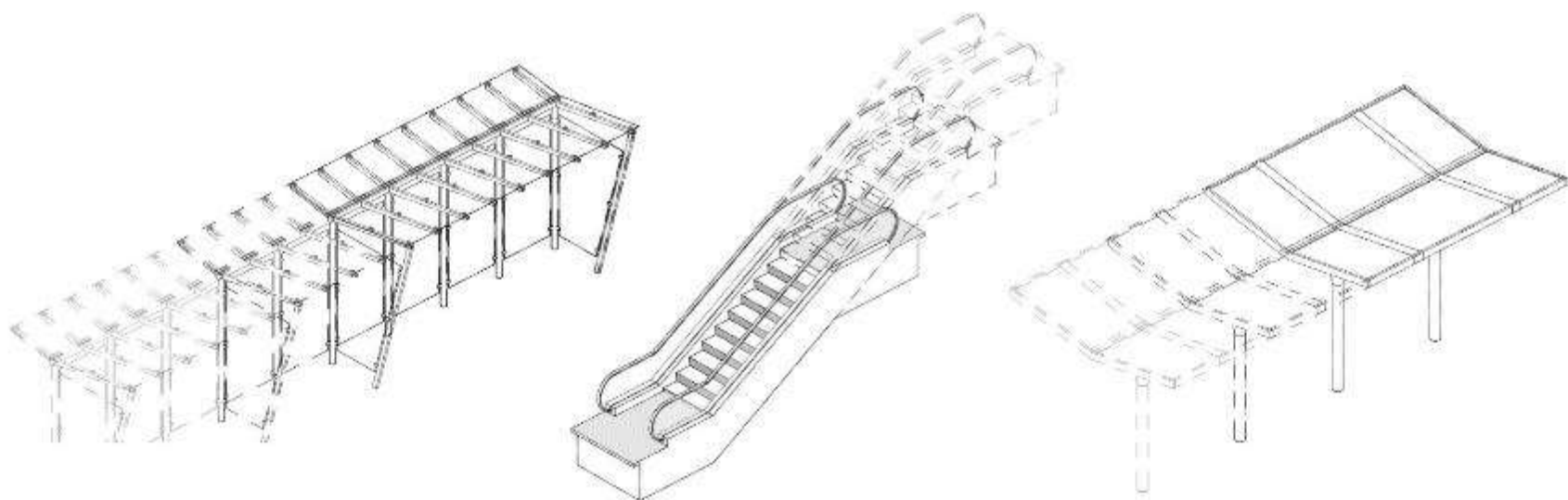


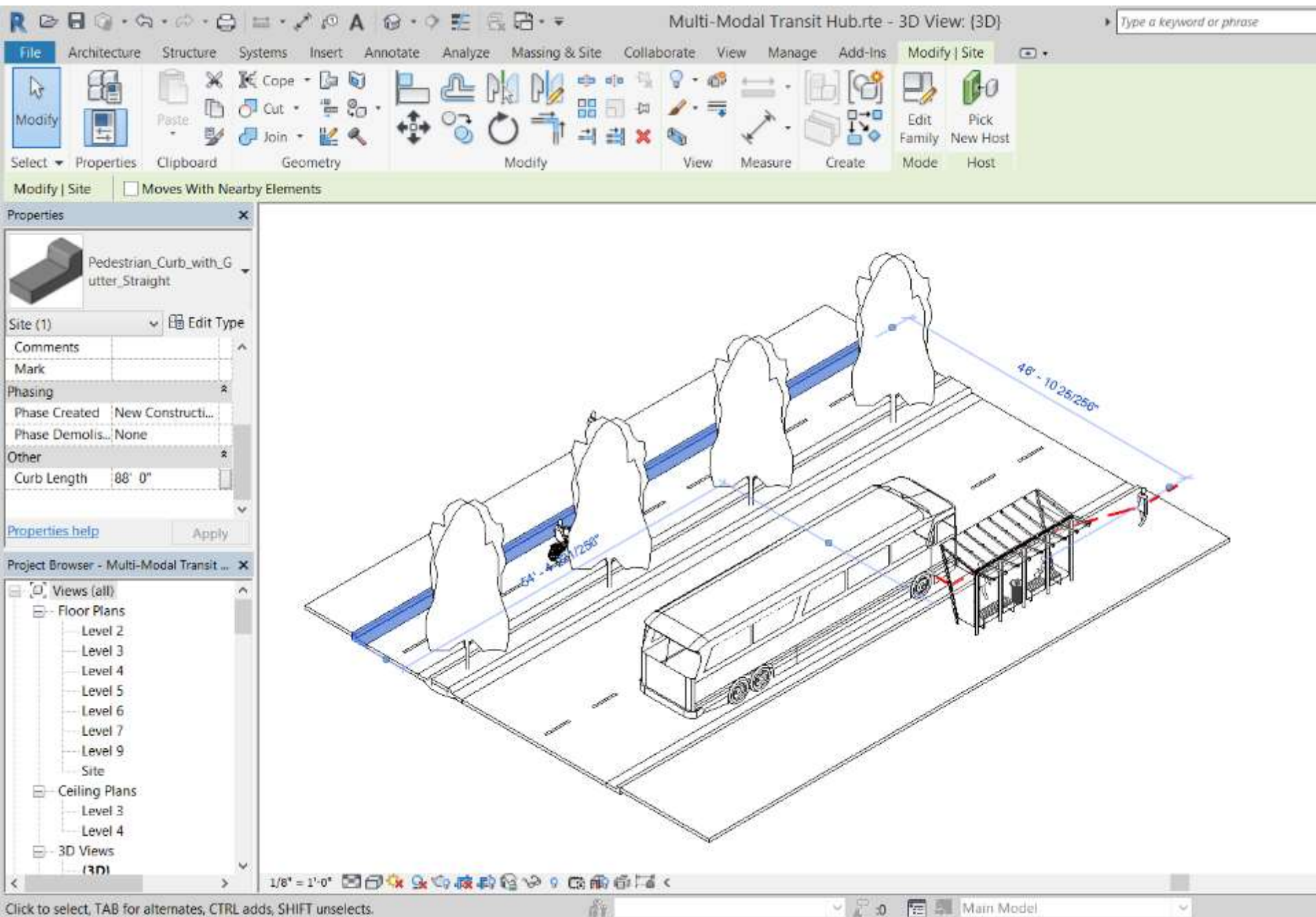
14-Ento
Pushin

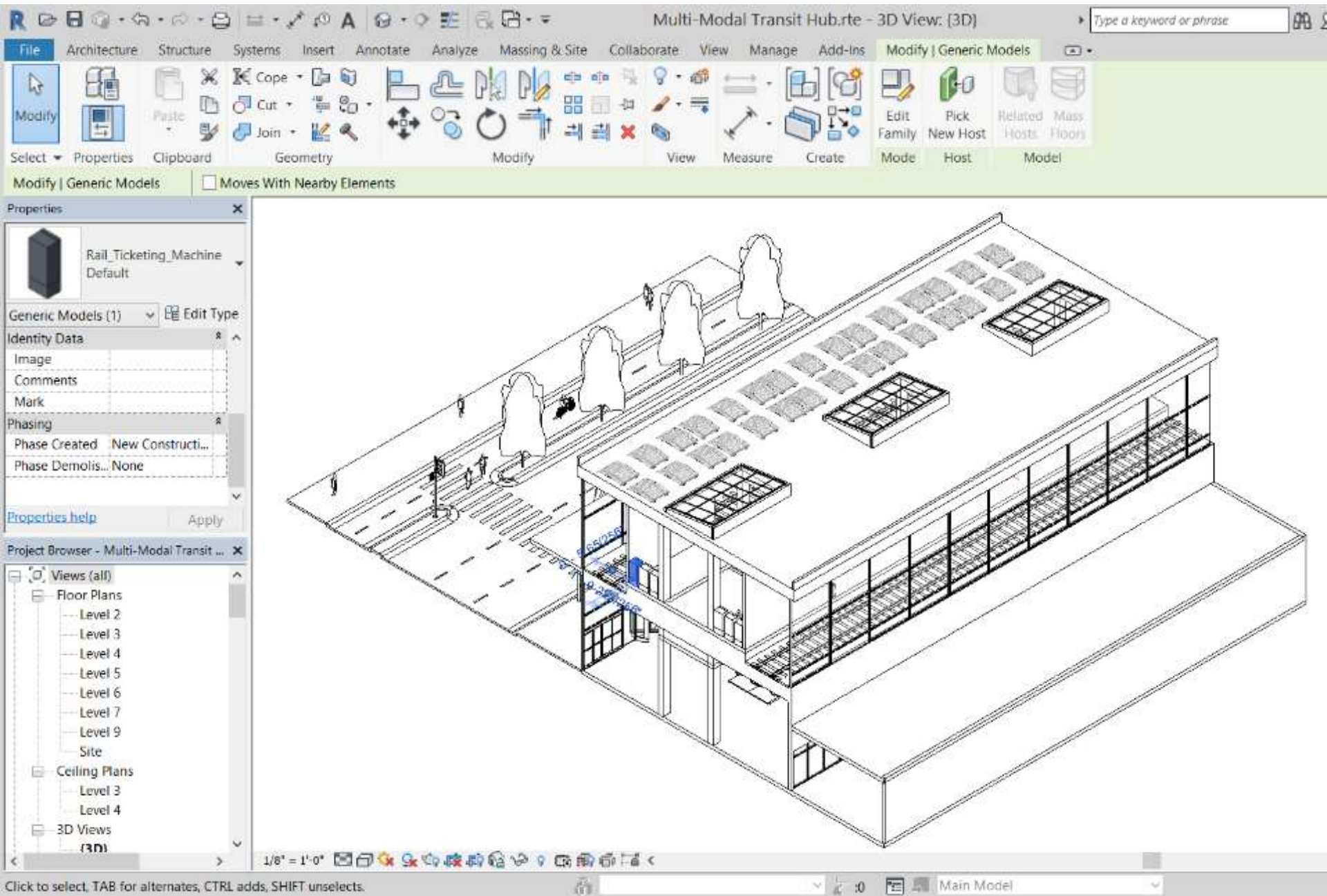


Sample Architecture
Family

































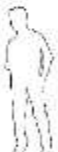







































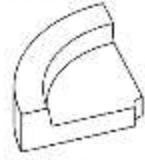
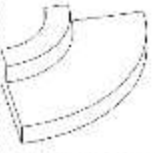













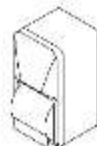


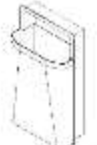










































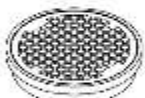












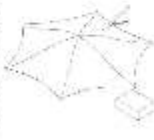











Inventory

1 Boy 	2 Boy Scooter 	3 Children 	4 Dog 	5 Family 	6 Family 	7 Dad-n-Child 	8 Girl 	9 Man Jogger 	10 Man Jogger 
11 Wheelchair 	12 Man 	13 Couple 	14 Stroller 	15 Prosthetic 	16 Man Sitting 	17 Man Sitting 	18 Man Sitting 	19 Man Sitting 	20 Man 
21 Man 	22 Man-n-Dog 	23 Cane 	24 Crutches 	25 Bass 	26 Gym Bag 	27 Luggage 	28 Prosthetic 	29 Groceries 	30 Men 
31 Paraglider 	32 Protesters 	33 Teen Boy 	34 Teen Girl 	35 Troubadour 	36 Longboard 	37 Skateboard 	38 Pregnant 	39 Rollerblades 	40 Wmn Sitting 
41 Wmn Sitting 	42 Wmn Sitting 	43 Woman 	44 Woman 	45 Woman 	46 Woman 	47 Wmn-n-Dog 	48 Backpack 	49 Granny Cart 	50 Cello 
















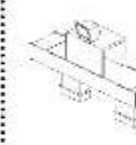



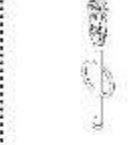






























Inventory

51 White Cane 	52 Crutches 	53 Crutches 	54 Luggage 	55 Stroller 	56 Walker 	57 Airport 	58 Airport 	59 Wheelchair 	60 Handbag 
61 Luggage 	62 Luggage 	63 Luggage 	64 Cart 	65 Gita 	66 Segway 	67 Crosswalk 	68 Curb 	69 Curb 	70 Curb 
71 Tactile 	72 Elevator 	73 Freight 	74 Escalator 	75 Sliding 	76 Double Door 	77 Revolving 	78 Baby Change 	79 Grab Bar 	80 Tampons 
81 Tampons 	82 Seat Cover 	83 Soap 	84 Toilet Paper 	85 Towels 	86 Hand Dryer 	87 Rubbish 	88 Lockers 	89 Lockers 	90 Lockers 
91 Fountain 	92 Shower Pan 	93 Shower Valve 	94 Shower Head 	95 Sink 	96 Partition 	97 Floor Drain 	98 Roof Drain 	99 Extinguisher 	100 Fire Hose 














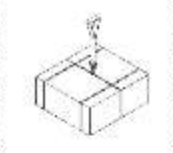














Inventory

101 Wall Drain 	102 Hydrant 	103 Hydrant 	104 Sprinkler 	105 Light 	106 Fan 	107 Elec Panel 	108 PV Panel 	109 Turbine 	110 Gas Tank 
111 Pedi Charge 	112 TV 	113 ATM 	114 Vending 	115 Vending 	116 Book Shelf 	117 Exit Sign 	118 Sign 	119 Restrooms 	120 Street Name 
121 Speed 	122 Street Sign 	123 Traffic Light 	124 Hiway Sign 	125 Trench 	126 Manhole 	127 Bollard 	128 Street Lamp 	129 Rubbish 	130 Recycling 
131 Bench 	132 Swings 	133 Playground 	134 Gate 	135 Fence 	136 Support 	137 Umbrella 	138 Table 	139 Umprella 	140 LinkNYC 
141 Veg Divider 	142 Ivy 	143 Living Wall 	144 Shrub 	145 Plant 	146 Tree 	147 Tree Grate 	148 Grass 	149 Bicycle 	150 Bicycle 

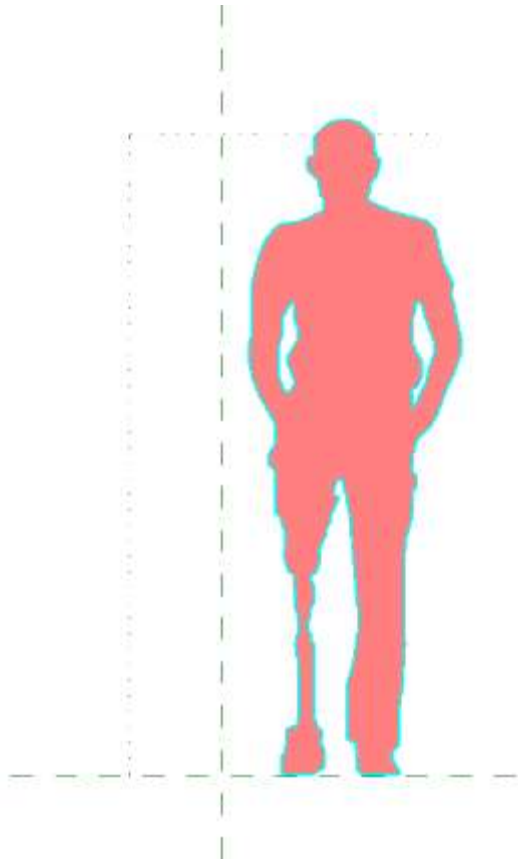
Inventory

151 Bicycle 	152 Bicycle 	153 Bicycle 	154 Bicycle 	155 Bike Carrier 	156 Bike Carrier 	157 Bike Rack 	158 Bollard 	159 Bike Rack 	160 Bike Cage 
161 Bike Tower 	162 Bike Share 	163 Turnstile 	164 Turnstile 	165 Stanchion 	166 X-Ray 	167 Bus Shelter 	168 Gas Pump 	169 AutoBollard 	170 Meter 
171 Tickets 	172 Parking 	173 Barrier 	174 Lane Stripe 	175 Auto 	176 Asshole 	177 Box Truck 	178 Food Truck 	179 Moving Van 	180 Semi 
181 Tanker 	182 Concrete 	183 RV 	184 Sweeper 	185 Fire Engine 	186 Ambulance 	187 Motorcycle 	188 Sidecar 	189 Forklift 	190 Bus 
191 School Bus 	192 AutoNom 	193 Golf Cart 	194 Tuk Tuk 	195 Solar Car 	196 Supr Scoot 	197 Trailer 	198 Engine 	199 Container 	200 Passenger 

Inventory

201 Tanker 	202 Funicular 	203 Monorail 	204 Hopper 	205 Streetcar 	206 Station 	207 Tickets 	208 AT-AT 	209 Ferry 	210 Jet Ski 
211 Kayak 	212 Sailboat 	213 UAV 	214 UAV Pack 	215 Prop Plane 	216 BiPlane 	217 Sea Plane 	218 Jet 	219 Jumbo Jet 	220 Helicopter 
221 Cart 	222 Luggage 	223 Air Balloon 	224 Gondola 	225 Crane 	226 Crane 	227 Crane 	228 Crane 		

Entourage Diversity

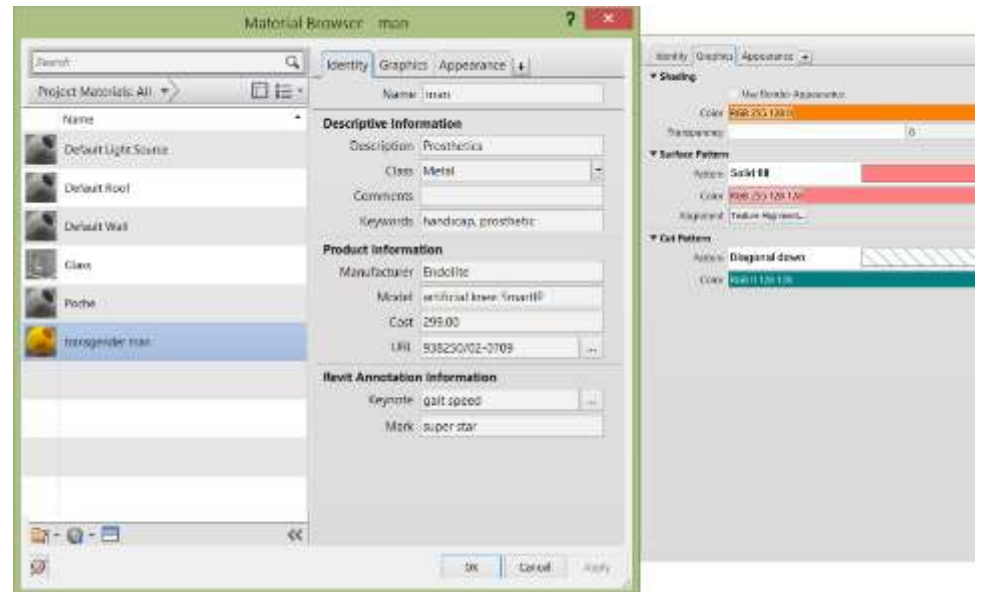
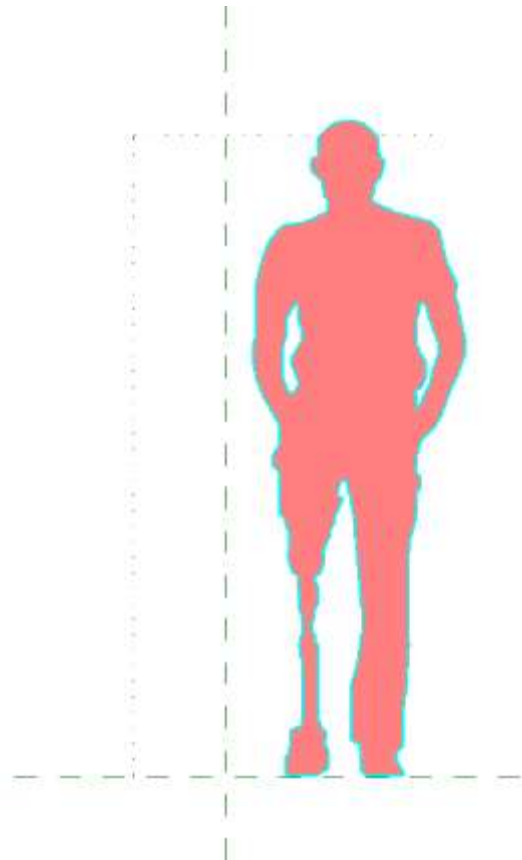


Man with Prosthetic Leg



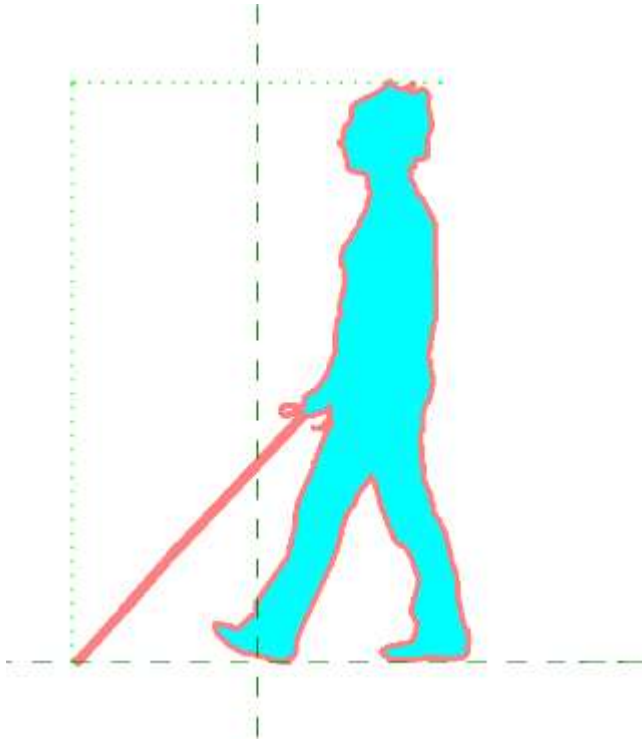
Default BIM Man

Entourage Diversity

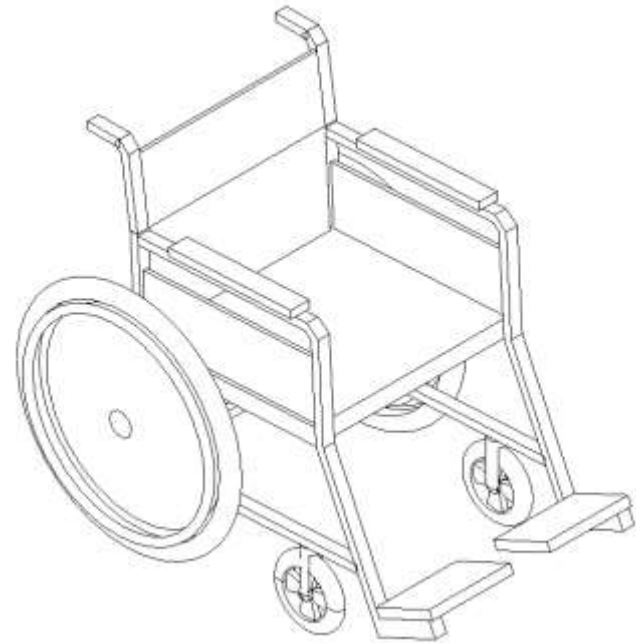


Man with Prosthetic Leg

Entourage Diversity

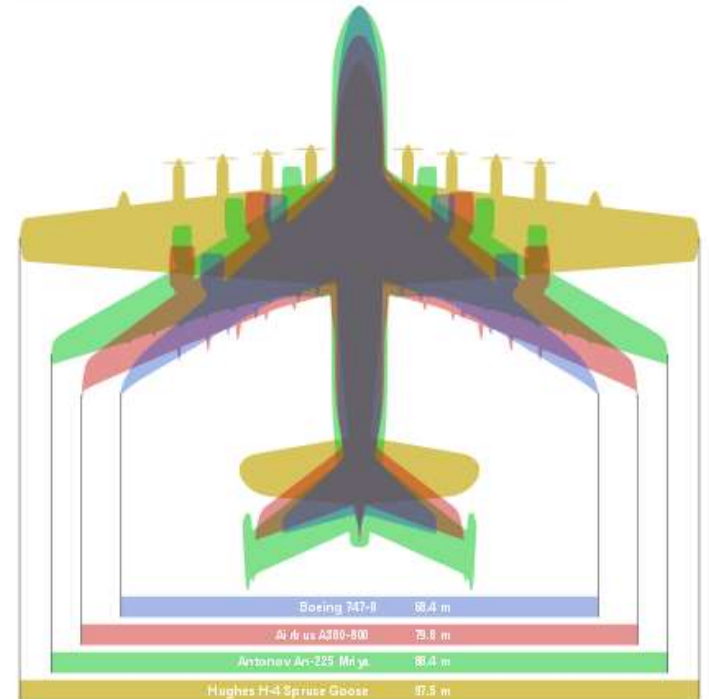
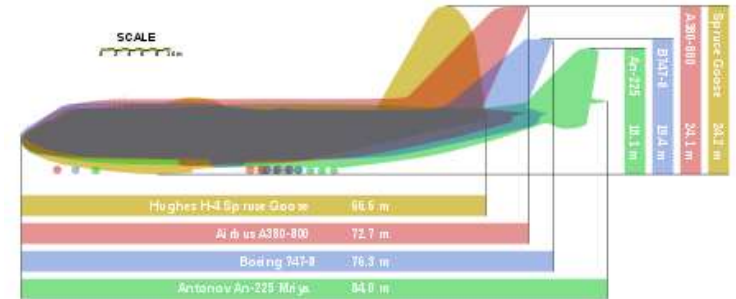
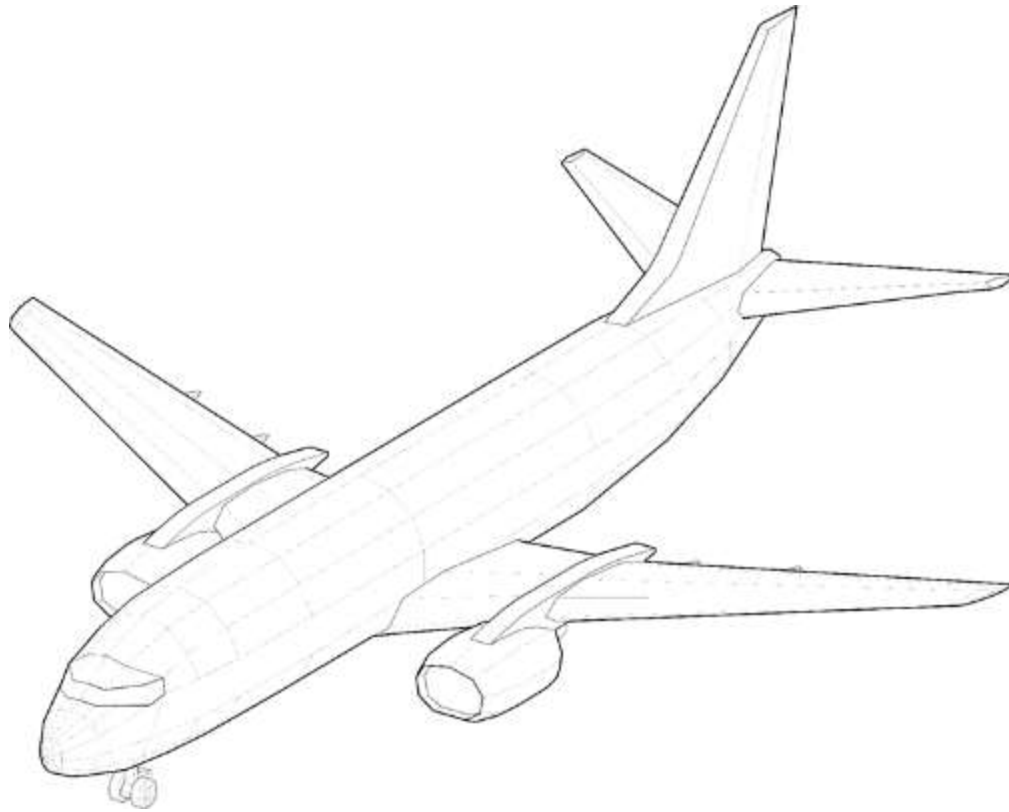


Blind young woman

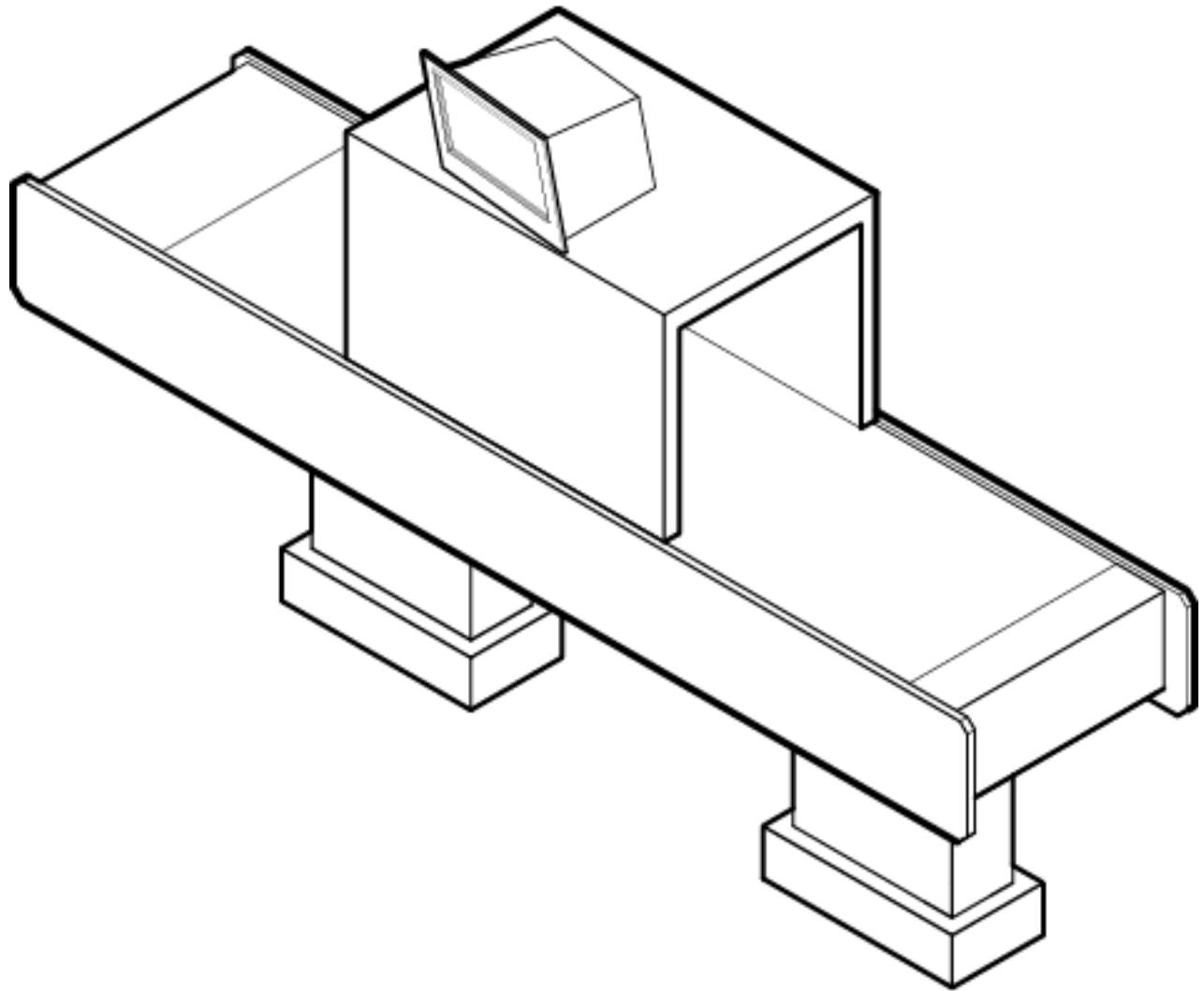


Handicap Objects

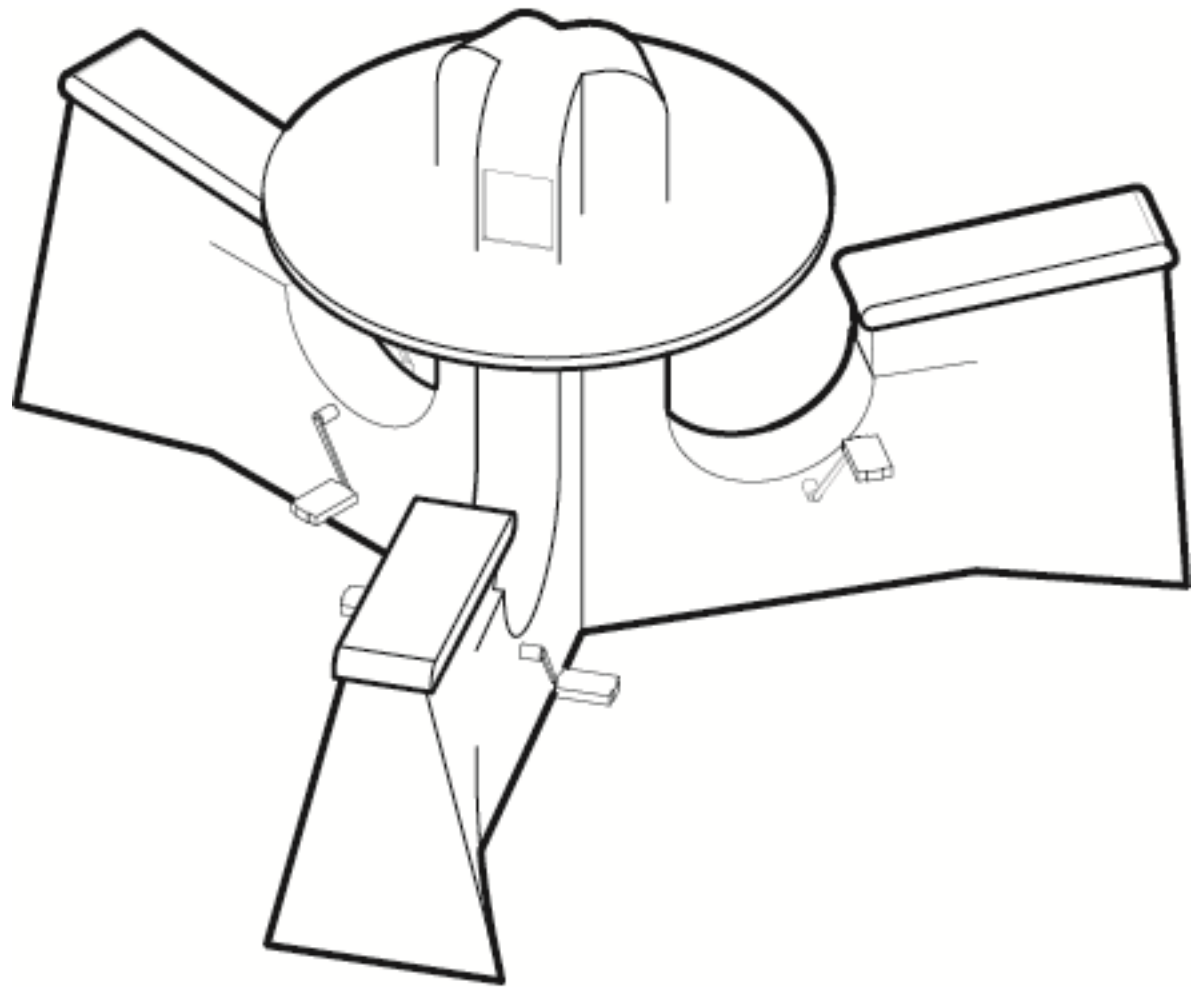




Airport Plane Size Consideration

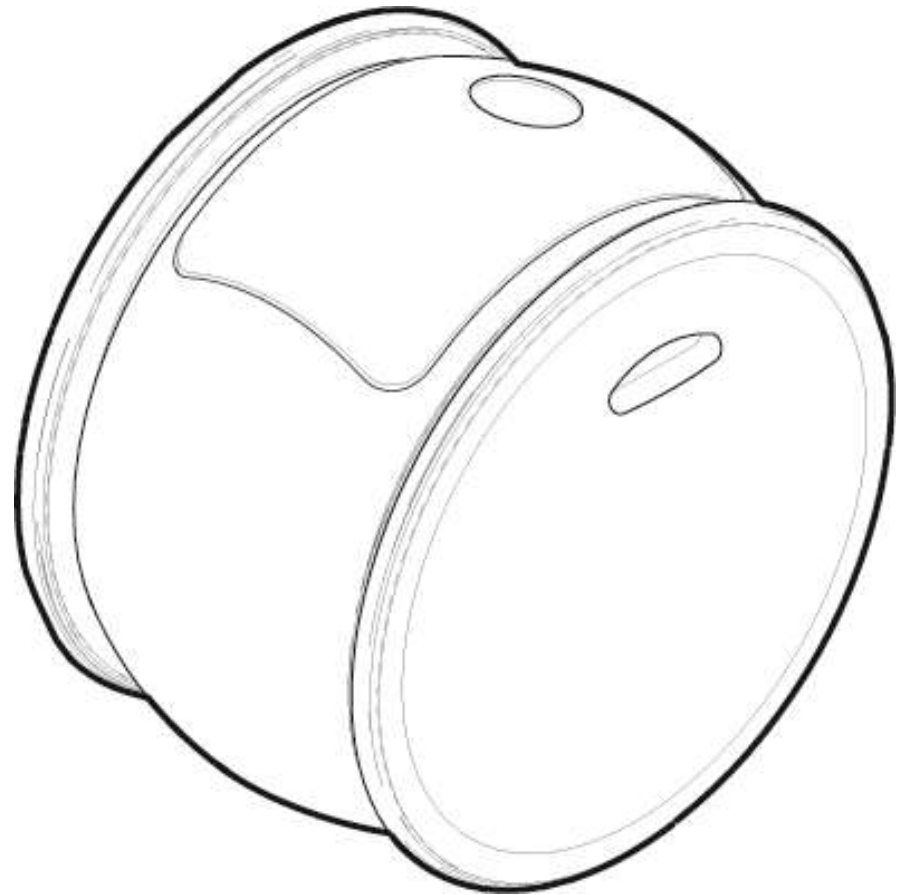


Airport Xray Screening



Pedal Charging Station





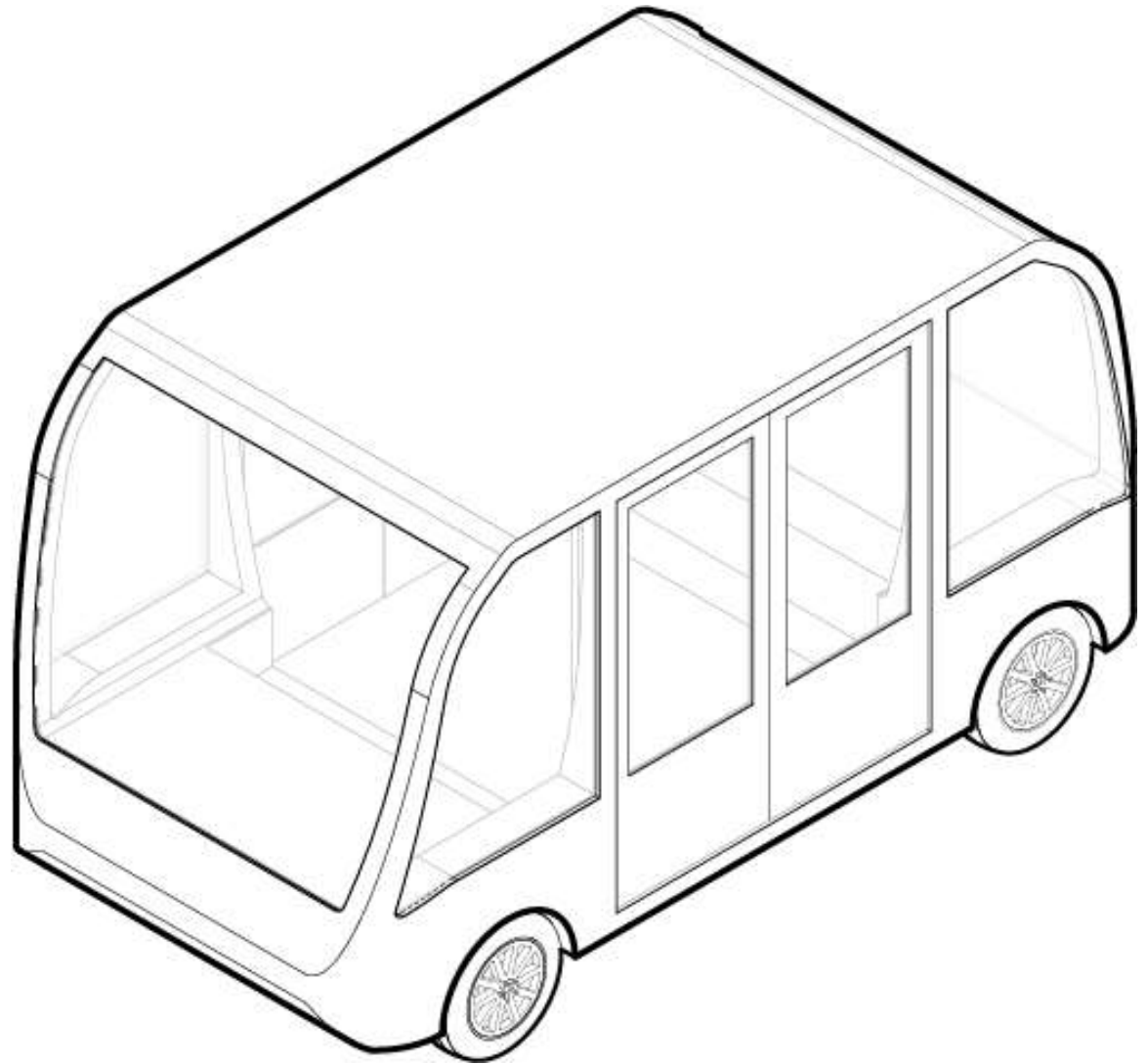
Gita Robotic Walker





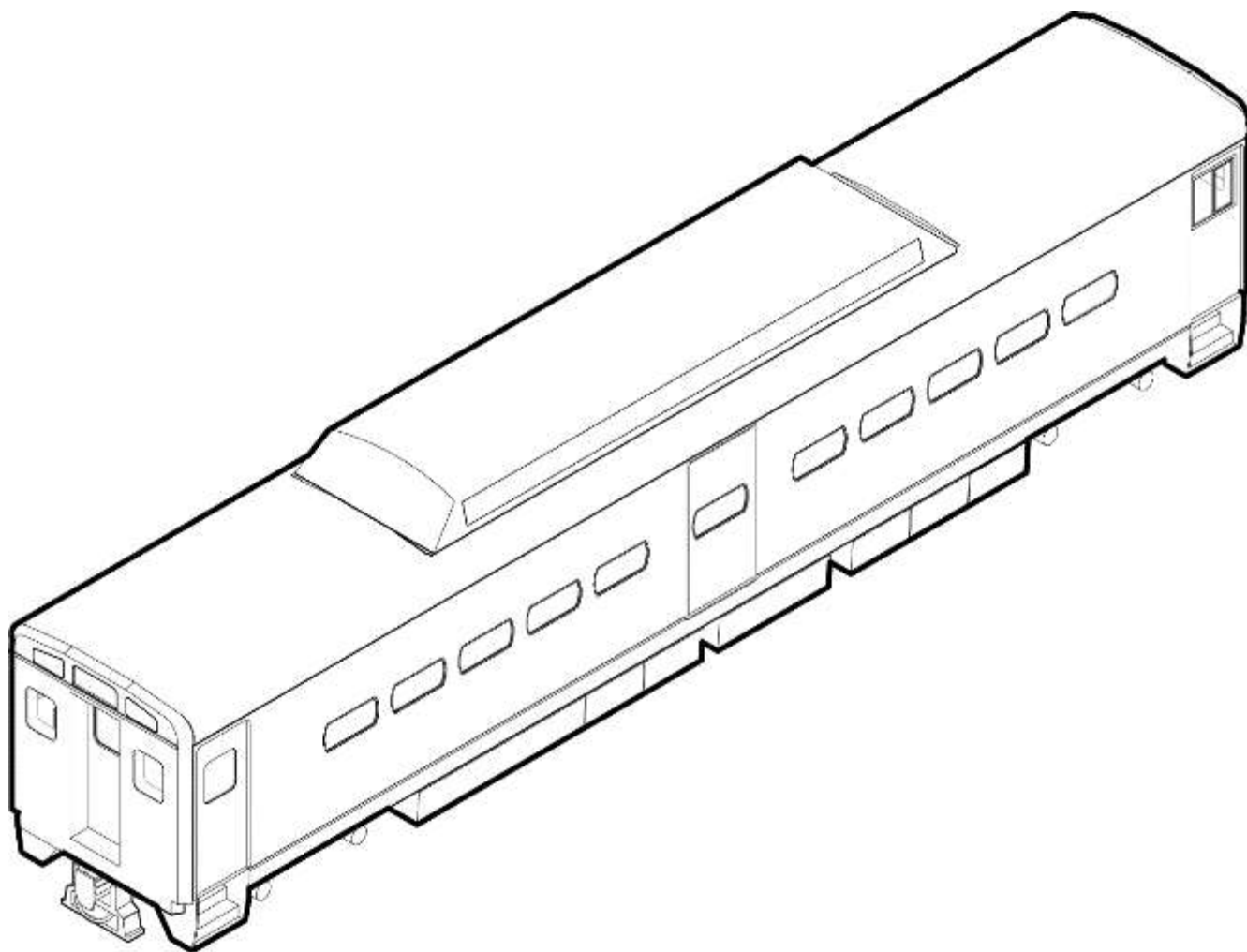
Bike Food Cart



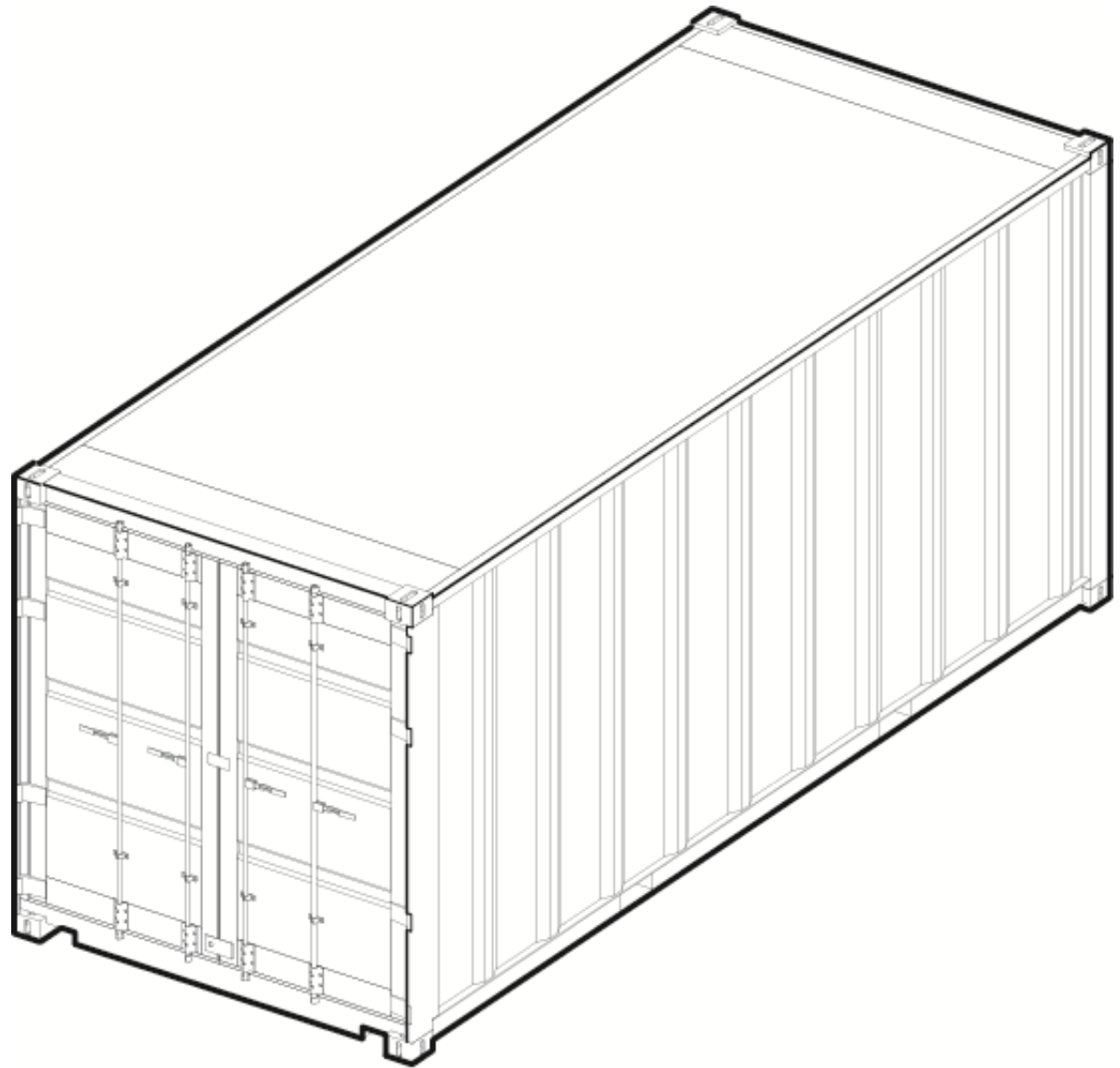


Autonomous Shuttle

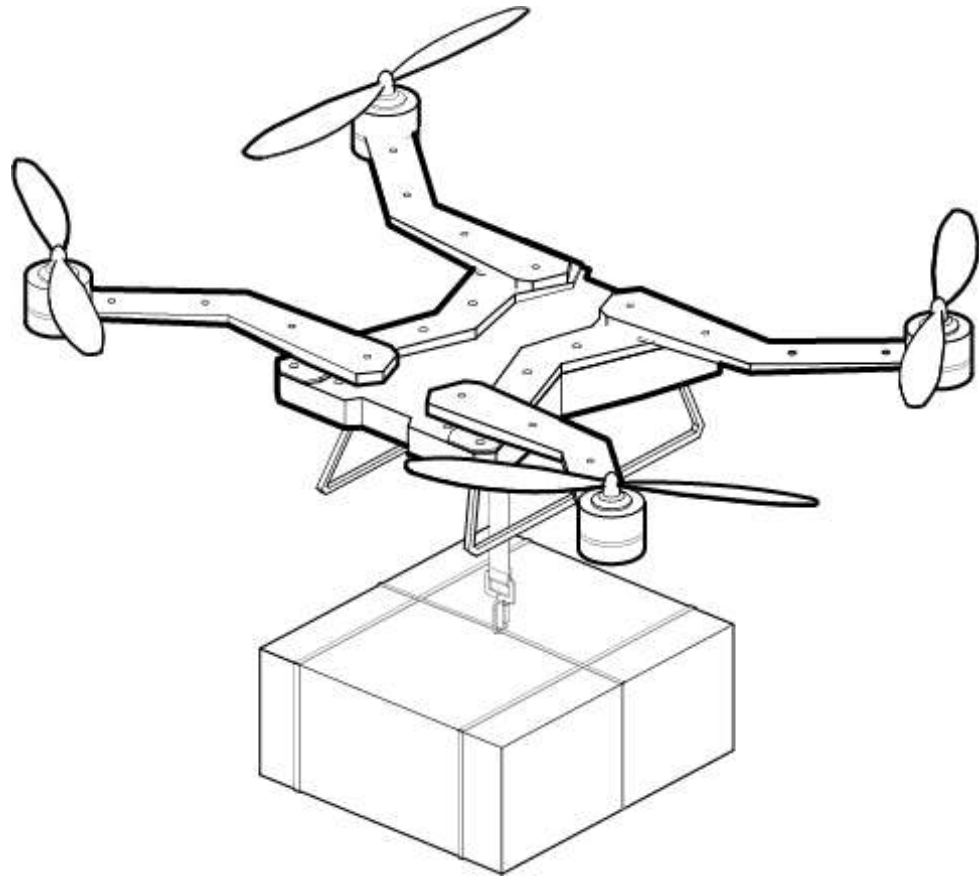




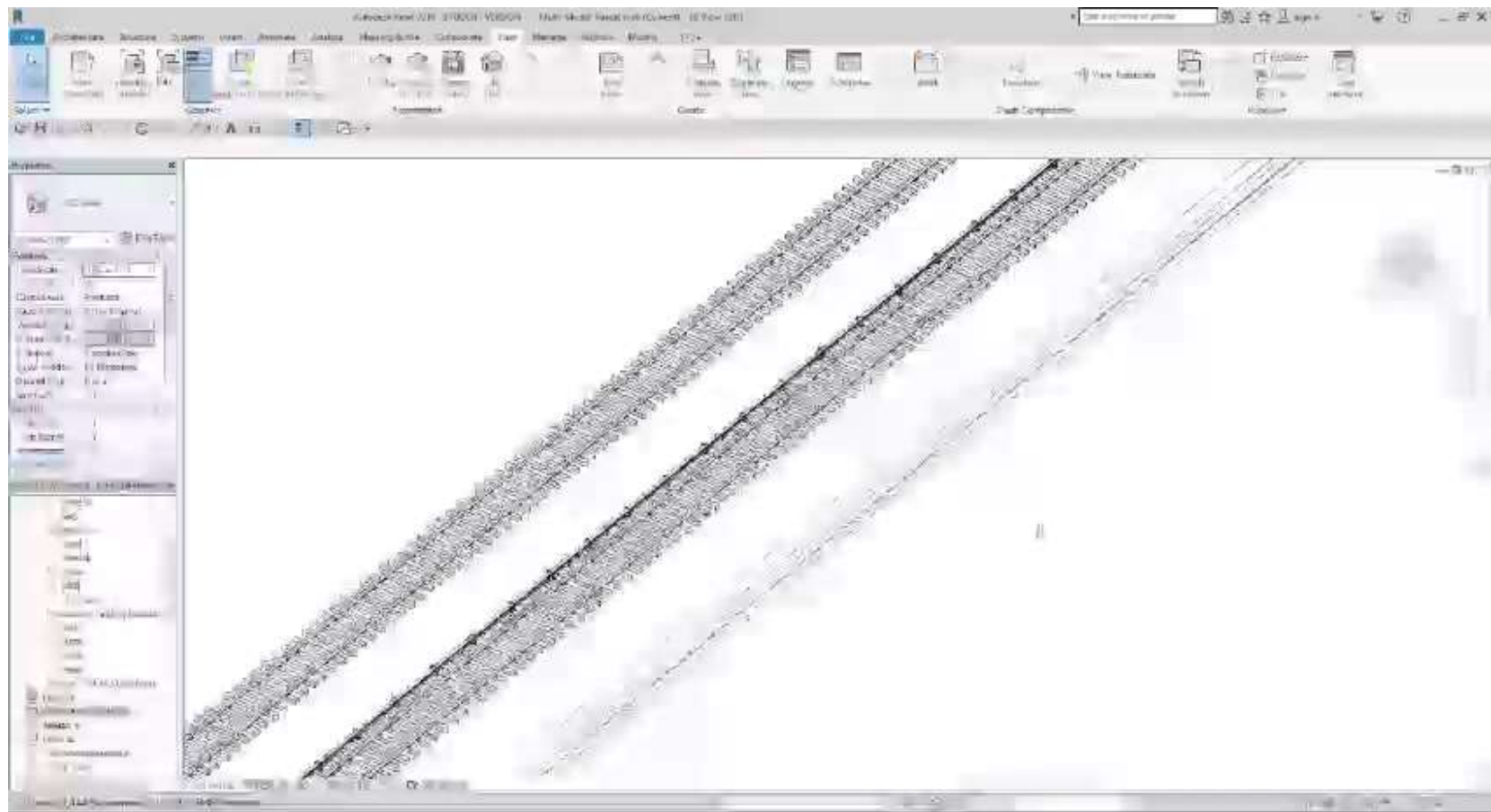
Passenger Rail



Freight Container



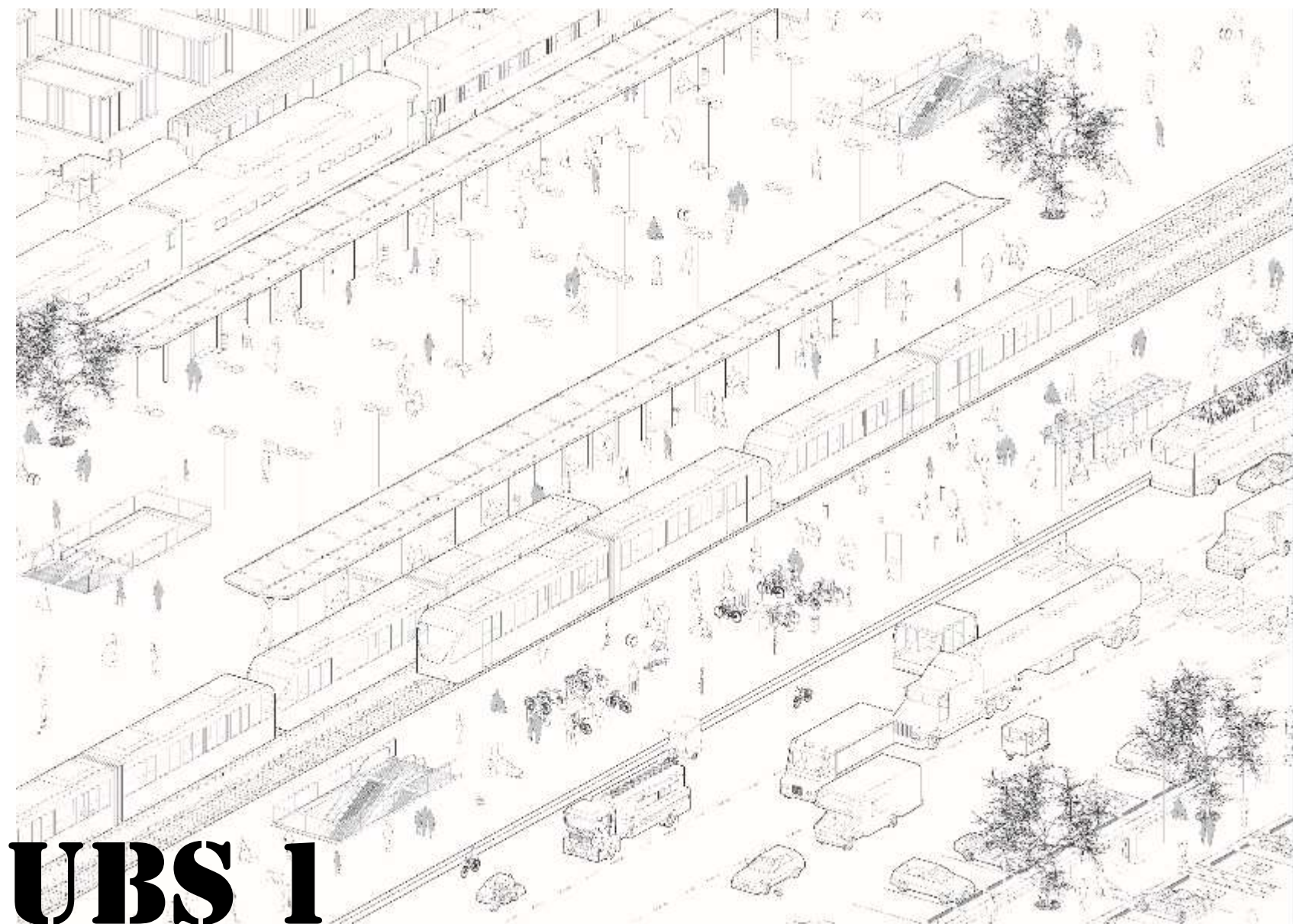
Drone Package Delivery



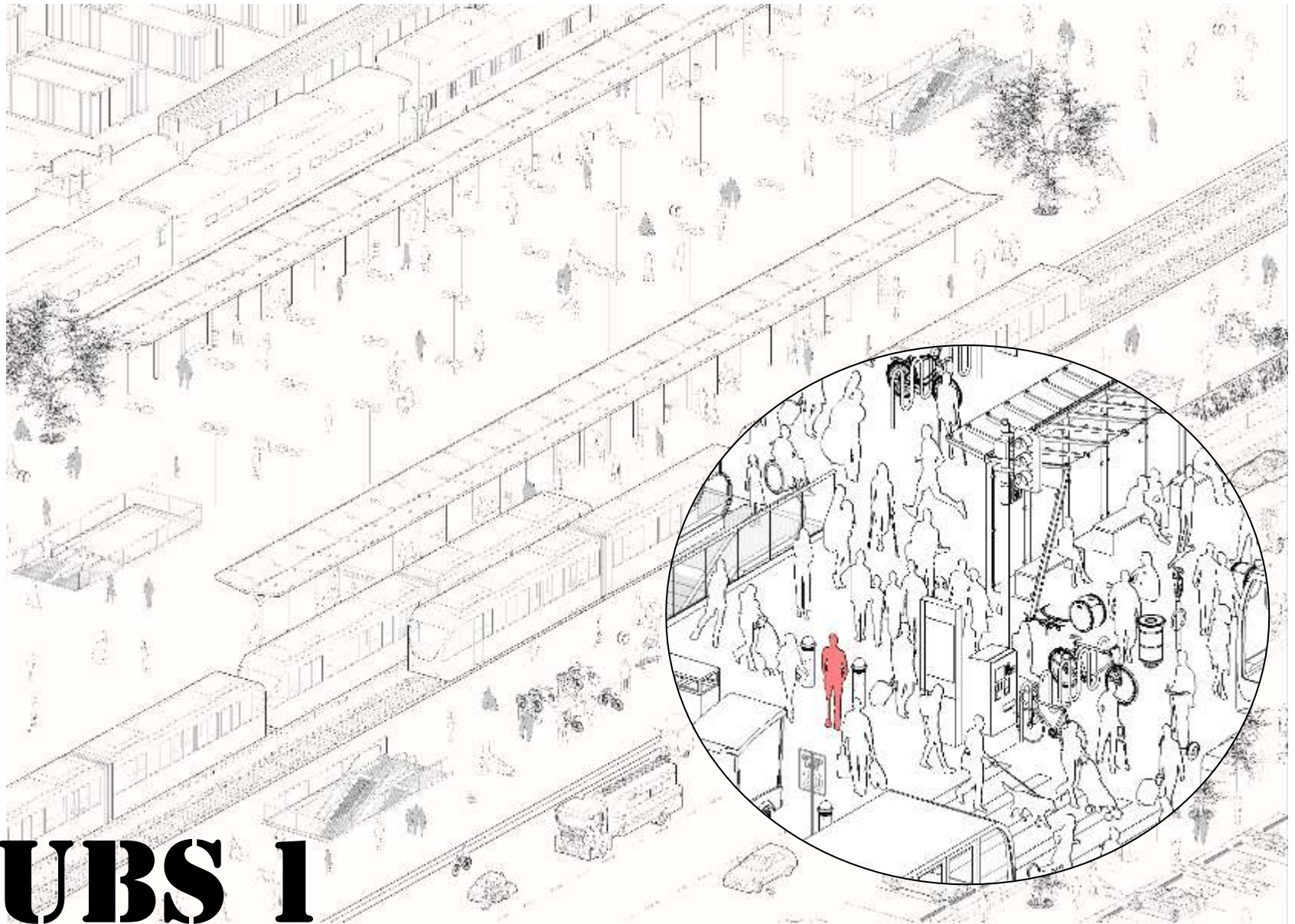
A model based scenario demonstrating relevant predicaments of multi-modal transit integration. This setup facilitate development of a multitude of 3D BIM components for multimodal transport system.

User Based Scenario (UBS)

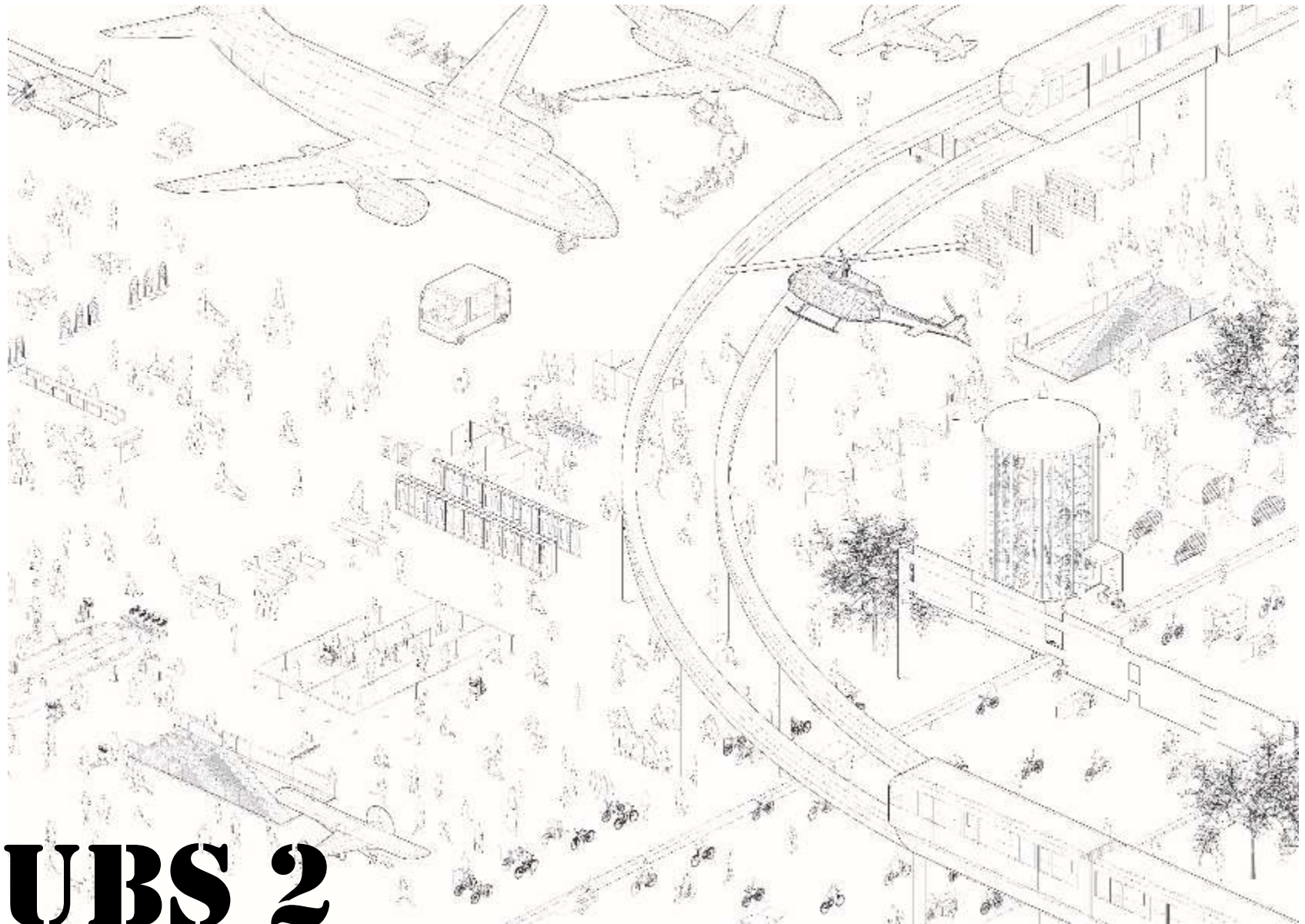




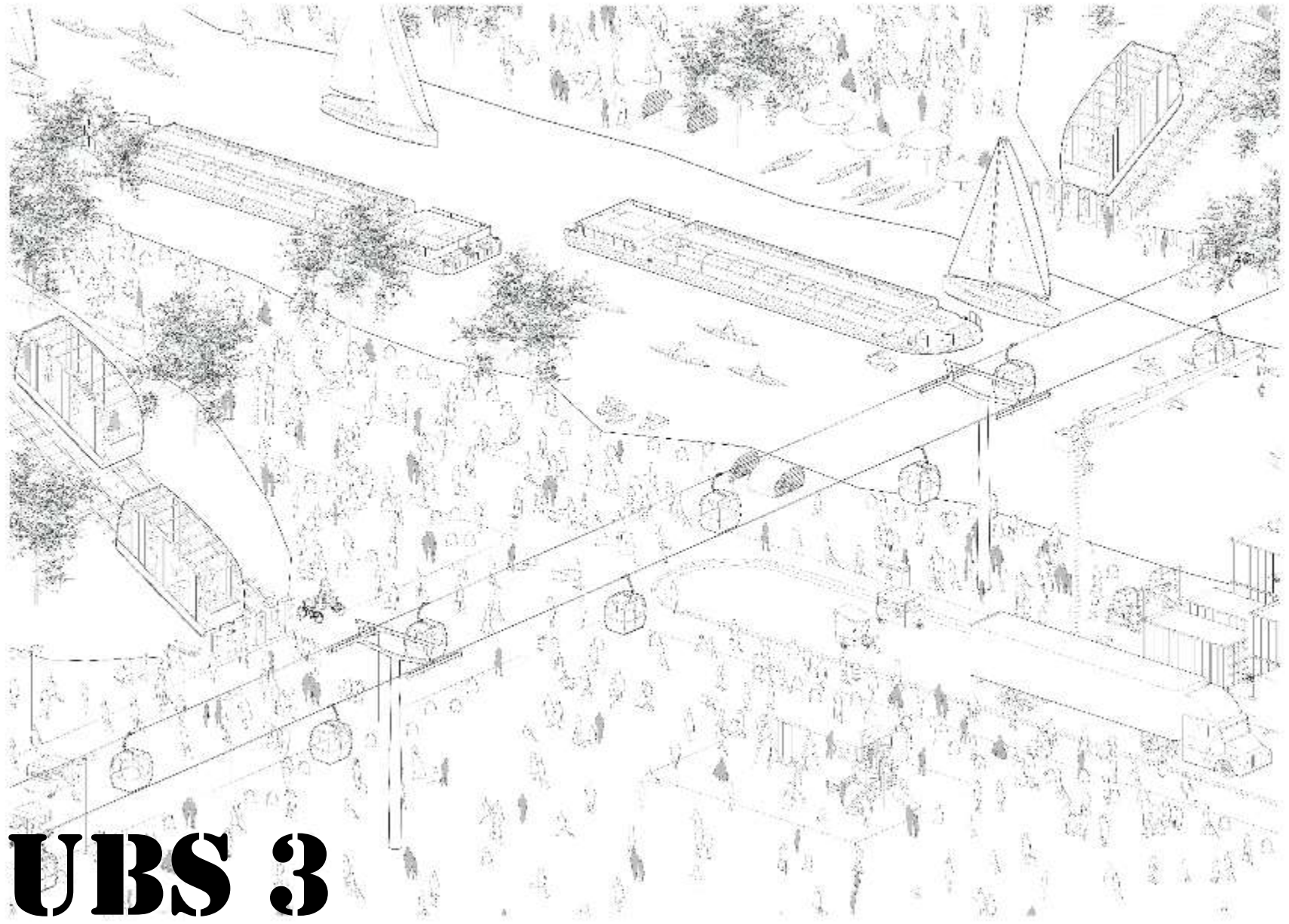
UBS 1



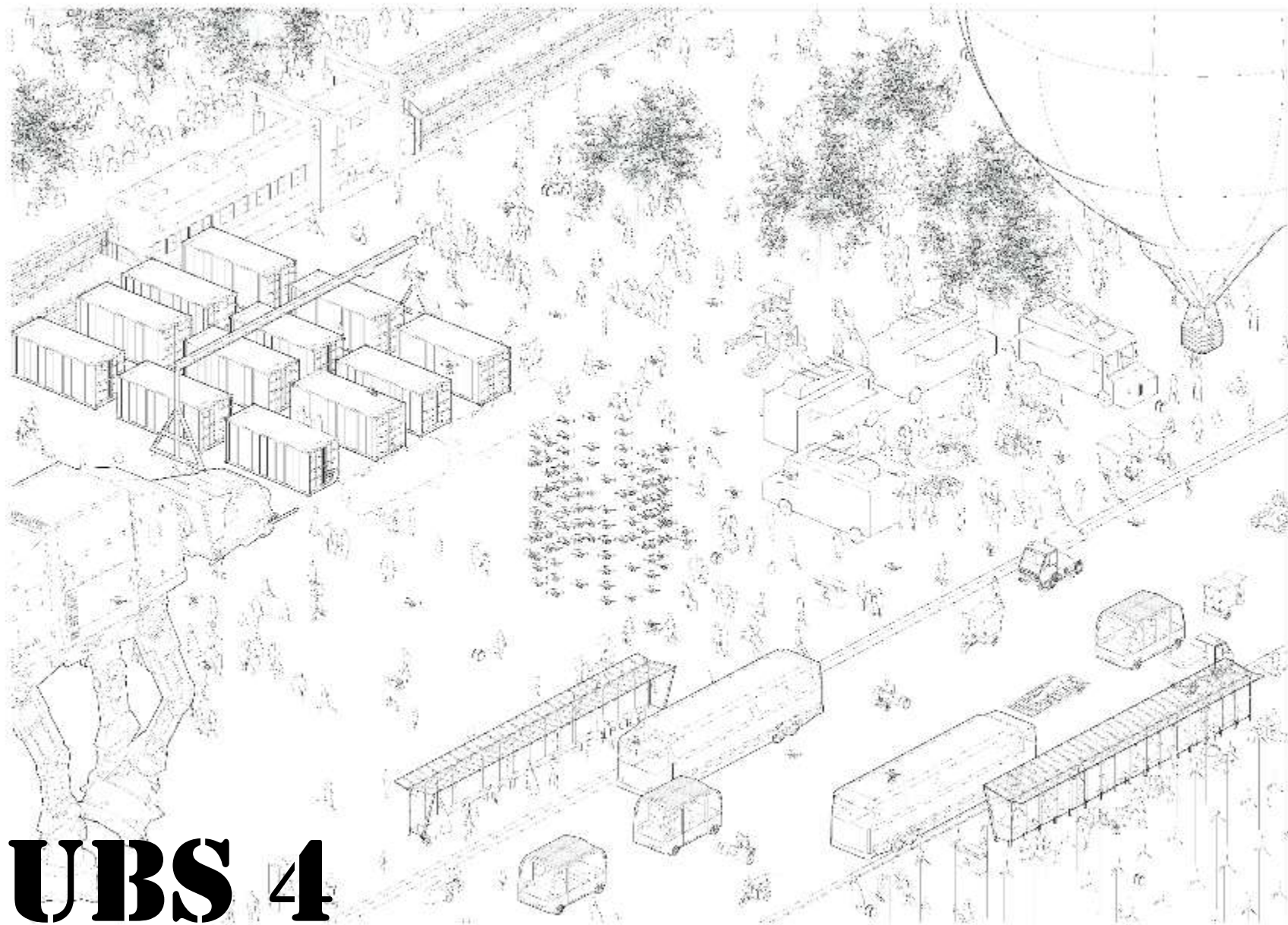
UBS 1



UBS 2



UBS 3



UBS 4

Conclusions:

- The creation and definition of Building Information Modeling (BIM) templates— holds economic development implications of alternative transportation design along with associations of innovations in intelligent and sustainable transportation system planning.
- A multi-modal approach (GPS and GIS inclusions) to the template itself requires a revamping of the BIM platform.
- This study becomes a critical reassignment of the role of BIM as active player in the betterment of multi-modality design thinking. With reference to governmental departments of transportation or private service providers, their future efforts to multi-modal services, ultimately effect informed policy-making.
- The BIM template would then also include the facilitation of public-private partnerships for freight mobility planning and operation efficiency, along with advanced thinking of the future of self-driving transportation networks.

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